

THE DIETARY HABITS OF SELECTED GROUPS OF HIGH SCHOOL GIRLS
AND COLLEGE WOMEN LIVING IN KANSAS

by

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INTRODUCTION

Inadequate diets appear to be an important cause of subnutrition occurring too frequently in the United States. Nutrition workers are attempting to overcome this condition by improving the diets and eating habits of the American people.

Malnutrition may be caused by a diet insufficient in amount or kind of foodstuffs or faulty in accepted dietary practices. Many young persons are undernourished because their food consumption is too low for their daily activities. The body is thus forced to make up the deficit which may be done for a limited time by depletion of the body stores. This inadequate intake of food may be the result of insufficient breakfasts and lunches. Poor habits, such as between meal eating, also contribute to malnutrition. Such practices dull the appetite and crowd out more important foods offered at meal time, which are needed to protect the body in its fight against malnutrition.

In late years, many young college women and high school girls have chosen to limit their food consumption to satisfy their desires for slender figures. At the same time, the ever-increasing extra-curricular activities of these age-groups have placed a greater burden on the student and re-

duced her hours of rest. Thus there are two important factors contributing to this state of malnutrition; inadequate food and insufficient rest.

An attempt has been made in this study to gain some knowledge of the food habits and the adequacy of the diets of a group of high school and upper-and under-class college women. It was believed that the information thus acquired would be helpful in dealing with malnutrition in these age-groups.

REVIEW OF LITERATURE

Comparatively few studies have been reported which show the effects of diet and health habits on the physical efficiency of high school girls and college women.

Chaney (1927) made a survey of the food consumed by two groups of home economics seniors at Kansas State College. She noted interesting facts concerning the adequacy of the diets of these students and the extent to which the teachings of a course in dietetics were practiced.

At the beginning and again at the close of the semester each dietetics student was asked to keep an accurate account of her food intake for a three-day period. A comparison was made of the two food records for each student. It indicated that only three of 76 young women obtained

what was considered a diet sufficient to maintain good health during the first period of the survey, while the number was increased to 14 during the last period. The dietary records at the close of the study suggested an increase in the use of milk, fruits, vegetables, and cereals. Eggs were consumed in small amounts in each period observed while desserts were popular in both instances. Between-meal eating was frequent, especially at the beginning of the study. This work showed that these college women were not obtaining an adequate diet, judged by commonly used standards, even after having had a course in dietetics.

Observing the diet and health habits of 68 junior high school girls living at Holton, Kansas, Johnson (1928) found rather undesirable practices in this age-group. The majority of the girls were receiving less than a pint of milk daily; however, a limited amount of tea and coffee was used. Cereals appeared in about three-fifths of the diets and 50.3 per cent of the girls ate less than one serving of vegetables other than potatoes each day. Fruits were inadequate in kind and amount but much less so than vegetables. Only one-fifth of this group consumed less than one serving of meat daily.

Between-meal eating was common. Each girl averaged approximately one food eaten between meals daily but some

ate as many as four times between meals during one day.

Hawley (1932) reviewed the methods used in gathering information concerning dietary habits. Recognizing that all knowledge of food consumption habits must be procured from the consumer, she noted that the manner of collecting data varied from dietary surveys, wherein only the food is studied, to cost-of-living investigations in which all of the items used by a family are included.

According to Hawley, the system ordinarily used to gather material for dietary studies is known as the account method. She believed this gave better results than those obtained from the schedule method commonly employed in acquiring cost-of-living data. Hawley suggested that with the former method, the desired information may be obtained from only a week's record of food consumption, while a cost-of-living study extending over a period of less than a year would be of little value.

That dietary investigations are one means of determining the food needs of the human body is a generally accepted fact, according to Chaney and Ahlborn (1934). These authors described two types of dietary studies, the A. P. (as purchased) or inventory method which gives average food consumption and the E. P. (edible portion) or individual study. The former, which usually covers a fairly long

period of time and a group of persons, includes all of the food purchased or otherwise secured during the period of the investigation, with more or less correction for waste. In contrast to this, the individual method is a weighed, short-time study of the food actually eaten by one or more persons.

Chaney and Ahlborn emphasized the many problems confronting the investigator in conducting a dietary study, among them, between-meal eating. They found it difficult to estimate the caloric value of such foods, the exact nature of which is unknown. Incomplete and inaccurate reports cause other problems to arise. The authors regarded figures on waste as usually inaccurate due chiefly to the widely divergent methods used in calculating these data.

An investigation by Latzke (1934) of the foods selected by college students eating at a cafeteria revealed that the diets were far below the accepted standards for adequacy. The results of her observations indicated a scarcity of vegetables, especially uncooked ones, a deficiency of fruits, and an excess of carbohydrate food. The diets of the women studied were also definitely deficient in whole grain cereals and milk.

Latzke suggested that the poor selection of food may have been due to lack of information on the part of the stu-

dent as to food needs, limited range of choice offered by the cafeteria, lack of funds, or customary habits of eating. A fairly large percentage of the group were known to earn part or all of their expenses, which indicated that, in general, funds were moderate or inadequate and were therefore a factor in the choice of food.

A survey of the dietary habits of 360 college women at the University of Wisconsin by Meiller (1937) showed that many of the accepted food rules had been violated by this group. The study indicated that 84.7 per cent of the subjects had meat at least once a day but 61.1 per cent used only one cup of milk or more daily. Only 35 per cent of the young women ate white potatoes each day. Meiller pointed out that this low percentage was probably due to the practice of omitting potatoes in order to lower the caloric intake. Over half of the group had a green or yellow vegetable at least once a day, thus meeting the standard for this food.

The requirement for citrus fruits or tomatoes was met by only 31.1 per cent of the young women, while but 22.5 per cent had as many as seven whole grain products per week. This again was probably due to the tendency to cut caloric intakes. Only 17.5 per cent of these students consumed one egg a day. Of this group 52.2 per cent restricted their

between-meal eating to six times or less per week. Candy constituted nearly one-third of the food eaten between meals. As many as 20 or more meals were consumed during the week by 69.2 per cent of these students.

A study made by Rose (1937) of the conditions contributing to the nutrition of students living in fraternity and sorority houses showed that, in general, national organizations had done little to aid local chapters in providing nutritious diets for their members. The local chapters, as a whole, required no training or experience for their food managers. The committee found a high percentage variation in the cost of food of 165 local chapters located from coast to coast.

Personal interviews with 70 sorority students on one campus by members of the committee disclosed some interesting data. Of this group, it was noted that 37 drank milk regularly, 13 had it occasionally, and 20 never drank it. Of the 70 cases, 16 never ate between meals, 30 did so rarely, and 25 partook of between-meal foods consistently. Only 51 of the number observed ate breakfast regularly. Of the others, nine usually had this meal but 25 eliminated it entirely. This study showed a definite need for fraternities and sororities to employ experienced and trained food managers to protect the health of their members.

Sherman (1937) recommended the following of certain dietary principles in order to have an adequate diet. He suggested that a normal appetite is not an accurate indication of the amount of food that should be consumed and maintained that the diet so chosen is usually adequate in energy, but lacking in protein, minerals, and vitamins. He believed that hunger and appetite are poor guides for determining the amount and kind of food to be consumed.

At Connecticut College, Chaney (1938) studied the relationship of diet and living habits to general health and the occurrence of colds. Her object was to determine if the knowledge gained after entering college improved the health of the students. Information concerning 2859 young women was obtained by questionnaires which supplied data on colds, headaches, digestion, elimination, diet, sleep, time spent out-doors, and frequency of smoking.

These observations continued over a period of five years. Questionnaires were given to the students of the four undergraduate classes. These were later grouped according to college classification. Tabulations were made and findings were compared for each of the groups. The results yielded some rather impressive data. Smoking which became a habit with the senior and junior college women appeared more often among the seniors. However, the juniors who smoked, did so more frequently.

During the stay at college one of the most noticeable changes was the decline in occurrence of colds. A habit which did not show improvement was that of sleep. The hour for retiring became later with a longer stay in college, the drop being particularly heavy between the autumn and spring of the freshman year. The senior women were the most deficient in sleep, about one-fourth of the group reporting only seven hours or less nightly.

These young women relished their meals and a large percentage ate all of the food served them. In addition, they ate sweets, fruits, and sandwiches between meals. The greater number of the students were accustomed to eating two or more vegetables a day and more than half consumed fruits twice daily.

A study of the underweight group indicated that these young women appeared to have more frequent colds, constipation, fatigue, and as a whole, received less sleep. However, their records for milk, fruit, and vegetable consumption were as good if not better than those of the entire group, but they used more coffee. Chaney recommended that a special effort be made by college administrators to provide every means possible to promote better health conditions for their students in order to raise their efficiency.

Nelson (1938) summarized the project of a group of home economics investigators of various sections of the United States who have worked jointly in a study of the nutritional status of college women. Six agricultural experiment stations of the north central region including the Universities of Minnesota, Nebraska, Wisconsin, and Ohio and the state colleges of Kansas and Iowa have cooperated in this work.

The weekly diet records of two thousand freshman women in these various states have been studied to find trends in food consumption. The results indicated a similarity of habits of eating in these young women. The diet records of the senior and junior women were also studied in the same way to determine whether or not the college instruction these students had received would change their food habits. This investigation is still in progress so the findings are not available in their entirety.

The diets of 100 college women located at the Utah Agricultural College were observed by Morris and Powers (1939). The purpose of the study was to discover the intervals at which certain essential foods made their appearance in the dietaries of this group. It was also desired to compare food intakes and number of meals eaten per week by individuals. The food habits were contrasted according to places

of eating which were classified as (1) home living, (2) boarding, (3) bachelor quarters, and (4) dormitory.

The results for the entire group showed a mean energy consumption below the accepted standard. The diets of the dormitory women were consistently higher in quality while those of the students living at home were uniformly lower. The mean intakes of those eating at boarding houses and the ones living in bachelor quarters were similar and neither so high nor so low as the other two groups. The mean of the calcium in all the diets was above the standard requirement of 0.68 gm. per 70 kg. of body weight. Phosphorus was below the accepted level of 1.32 gm. per 70 kg. man. The mean for the intake of iron was only slightly above the maintenance level of 8 mg. daily.

The greatest difference in the diets as a whole was in vitamin intake while the fuel and protein consumption varied least. Those living at home consumed the most milk, averaging 4.23 pints per capita per week. The students living in bachelor quarters used the least milk, their mean intake being only 2.6 pints. The young women living at home included more whole grain cereals, but those in bachelor quarters used more fruits in their dietaries, both cooked and uncooked.

The group from the boarding houses consumed the largest

amount of meat, pork being a favorite. Liver was included several times during the week for the students living in the dormitories and eggs appeared on these menus frequently.

Morris and Powers observed that students living in homes had the lowest caloric intakes but consumed the most candy bars. The study showed that deficiencies existed in the diets of all of the groups but the food of the students living in the dormitory ranked highest while that of the young women living at home was least adequate. However, as a whole, the variation among the diets of the four groups was not great.

In a challenge directed at school lunch room managers, Hawley (1939) brought out interesting and undesirable facts concerning the adequacy of the lunches served to children. She emphasized that it was the duty of those who serve food to help educate the public to better habits of food consumption. She suggested as satisfactory methods of educating children in food selection, the use of exhibits, posters, animal feeding experiments, and health lessons. She cited a Federal survey and studies of typical American families which showed that refined cereals, meats, and sweets were served excessively, while fruits and vegetables were definitely low and milk was often practically crowded out of the diets.

A big obstacle in the way of improving dietary standards was the lack of knowledge and interest on the part of the parents as to the needs of the body. Hawley believed this ignorance need not exist because of the many services placed at the disposal of the public including general health and school programs and university extension courses. She recommended that everything humanly possible be done to help stamp out existing deficiencies and that an effort be made to educate the parents to protect their children's health.

Haan (1939) observed the practices and problems of students who prepared their own meals while in attendance at a state teachers college in Platteville, Wisconsin. This study was made to determine if this group, who were mainly from rural communities and limited as to funds, served meals adequate to maintain health.

After college authorities had worked with the group for six months, questionnaires were distributed. The returns from 55 of the 110 men and 68 of the 86 women studied showed that 58 per cent of the men and only 26 per cent of the women used one pint of milk or more, as such, daily. When the amount used in cooking was added, this total increased to 67 and 44 per cent, respectively. Of the students reporting, 10 per cent of the men and 35 per cent of

the women used no milk. Of the entire group, 38 per cent received fewer than the recommended two vegetables other than potatoes daily, while 13 per cent of the men and a few women consumed no vegetable beside potatoes.

Tomatoes were used one to two times weekly by 80 to 86 per cent of the group. The standard requirement for eggs was met by 69 per cent of the men and 90 per cent of the women and whole grain cereals were used in 36 per cent of all the diets. Fruit was eaten by 89 per cent of the women while only 39 per cent of the men used it in the daily menu.

This investigation indicated that a large number of the meals were inadequate, also that there was a definite need for more milk, fruits, vegetables, and whole grain cereals. Haan recommended a more extensive study of the diets of college students, especially those from the lower income level.

A six-year study was made by Quast (1939) of the dietary habits of college students eating in a cafeteria. Because of the economic situation of 1932, experiments were made with low-cost diets and, as a direct result, improvement was seen in the selection of food. Three fixed meals a day at a cost of \$3.50 weekly were served to a group limited at first to 125 members. With the improvement in economic conditions, the price was raised slightly in order to provide more varied menus.

A variety of methods was used to stimulate other cafeteria patrons to choose well-balanced food. Adequate meals were provided at different price levels and an effort was made to have the food appeal to the eye as well as to the sense of taste. Fresh vegetables were used when available and a variety of combinations of food were designed to hold the interest of the consumer. Gaining the confidence of the students aided in the selection of better balanced meals. The plan proved satisfactory for the students' well being and showed, over a period of years, an improvement in the selection of food.

METHOD OF PROCEDURE

The present study was begun in the fall of 1938. During this time a food record for one week was obtained from each of 100 senior high school students. Of these, 65 were from the Gypsum, Kansas public school system located in Saline County and the remaining 35 were from nearby high schools in the same county. The majority of the girls were from rural communities with similar standards of living. The ages ranged from 12 to 17 years.

Similar food records were secured by members of the staff of Food Economics and Nutrition of Kansas State College from 100 college women, chiefly freshmen, enrolled in

a beginning food course for the fall semester of 1938-1939. Concurrently, and in the same way, another 100 weekly food records were procured from upper-class students enrolled in dietetics at Kansas State College. Thus the eating habits of both upper-and under-class college women were represented.

The dietary forms (Form 1, Appendix) for the food records were the same as those used in the foods classes at Kansas State College. Space was provided to record the name of the food, the kind, and the approximate amount. Foods eaten at the morning, noon, and evening meals, and those eaten between meals were listed separately.

For purposes of comparison, the food records of the college students were grouped according to the place of eating. The groupings used were (1) residence hall, (2) light housekeeping rooms, (3) living at home, (4) commercial eating houses, and (5) organized groups including sororities and boarding houses. Practically all of the high school students lived at home so no such classification was possible for them.

The occurrence of certain foods in the diets was determined for each group and comparisons were made. Also the individual water consumption was noted to determine if any differences could be observed in this health habit in high school and college students.

Preliminary to the collection of the data, the high school girls were called together by the investigator who explained the purpose of the study and asked their co-operation. The diet record sheets were then distributed with careful instructions for their use. Illustrations were given to show the exact procedure in recording the data. The girls were requested to bring any doubtful material to the investigator before placing it permanently on the records. This method aided in eliminating inaccuracies due to misunderstandings on the part of the students. The college group received similar directions from their instructors.

These records were tabulated in terms of the frequency distribution of the following essential foods: milk, vegetables (total cooked and uncooked, green or yellow, potatoes), fruit (cooked, uncooked, citrus and tomato), breakfast cereals, whole grain products, desserts not fruit, meat (meat, fish, and poultry), glandular meats, eggs, other protein, coffee, tea, and coco-colas. The foods eaten between meals and the number of meals eaten were also indicated. Milk was estimated in cupfuls, butter in teaspoonfuls, bread in slices, and other foods as servings. Each item was checked for the number of times it appeared during a week (Form 2, Appendix).

The tabulations for the 300 dietary records covering three age-groups were analyzed and evaluated (Form 3, Appendix). The method used was the same as that employed in the dietary studies carried on as a part of the regional project dealing with the nutritional status of college women which is an approved Purnell project at Kansas State College.

DISCUSSION OF RESULTS

The summaries of the weekly food records appear in Tables 1, 2, and 3. The numbers and percentages of students in each group are indicated. From these data the frequency distribution of certain foods in the diets of high school and under-and upper-class college women was assembled (Table 4).

The results indicated that the high school students consumed less milk than the college women (Table 4, Fig. 1). In general, it seemed that milk consumption was little different for the two groups of college students, although it was slightly in favor of the under-class women. Of the high school girls, 55 per cent used some milk, but averaged less than one cup per day. However, 19 per cent used two or more cups daily, 6 per cent used three or more cups a day, and 2 per cent used none at all as a beverage. The under-

Table 1. Summary of weekly food records of 100 high school girls.

		Frequency of eating											
		1-3		4-6		7-13		14-20		21 or more			
Diets checked:		Never occurring		times per week		times per week		times per week		times per week			
No.	Food	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent		
100	Milk ¹	2	2	28	28	27	27	24	24	13	13	6	6
	Vegetables, total	0	0	0	0	10	10	40	40	43	43	7	7
	cooked, except po-												
	tatoes	9	9	46	46	31	31	14	14	0	0	0	0
	green or yellow	7	7	55	55	28	28	10	10	0	0	0	0
	raw	11	11	45	45	23	23	19	19	2	2	0	0
	other ²	16	16	59	59	22	22	3	3	0	0	0	0
	White potatoes	0	0	13	13	42	42	45	45	0	0	0	0
	Fruit, total	1	1	9	9	11	11	58	58	17	17	4	4
	cooked	19	19	47	47	20	20	14	14	0	0	0	0
	raw ³	4	4	16	16	25	25	48	48	4	4	3	3
	Citrus or tomato	5	5	29	29	33	33	31	31	2	2	0	0
	Bread ¹	0	0	0	0	0	0	4	4	13	13	83	83
	hot	25	25	53	53	15	15	6	6	0	0	1	1
	Breakfast cereal	9	9	50	50	27	27	14	14	0	0	0	0
	Whole grain products	15	15	43	43	19	19	14	14	9	9	0	0
	Desserts, not fruit	1	1	11	11	26	26	52	52	10	10	0	0
	Meat, fish, poultry ⁴	0	0	4	4	31	31	62	62	3	3	0	0
	Glandular meats	94	94	4	4	1	1	1	1	0	0	0	0
	Other protein	7	7	59	59	29	29	5	5	0	0	0	0
	Eggs	16	16	45	45	26	26	13	13	0	0	0	0
	Butter ¹	0	0	21	21	23	23	43	43	8	8	5	5
	Coffee ¹	38	38	25	25	12	12	18	18	4	4	3	3
	Tea ¹	79	79	10	10	6	6	5	5	0	0	0	0
	Coco cola ¹	76	76	22	22	1	1	1	1	0	0	0	0
	Eating between meals	4	4	32	32	41	41	23	23	0	0	0	0
	Number meals eaten	0	0	0	0	0	0	2	2	37	37	61	61

1. Milk, water, tea, coffee, and coco-cola were calculated in cupfuls; butter in teaspoonfuls, bread in slices, and other food in servings.
2. Vegetables other than green, yellow, or potato.
3. Fruit raw, other than citrus or tomato.
4. Glandular meats not included.

Table 2. Summary of the weekly food records of 100 under-class college women.

Diets checked:	Food	Frequency of eating											
		1-3		4-6		7-13		14-20		21 or more			
		Never occurring	times per week	times per week	times per week	times per week	times per week	times per week	times per week				
No.		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
100	Milk ¹	4	4	10	10	11	11	42	42	25	25	8	8
	Vegetables, total	0	0	0	0	0	0	6	6	24	24	70	70
	cooked, except												
	potato	0	0	6	6	12	12	77	77	5	5	0	0
	green or yellow	0	0	8	8	29	29	53	53	10	10	0	0
	raw	0	0	11	11	33	33	49	49	7	7	0	0
	other ²	0	0	20	20	52	52	28	28	0	0	0	0
	White potatoes	0	0	11	11	40	40	47	47	2	2	0	0
	Fruit, total	0	0	4	4	7	7	48	48	37	37	4	4
	cooked	7	7	33	33	44	44	16	16	0	0	0	0
	raw ³	1	1	14	14	22	22	55	55	6	6	2	2
	Citrus or tomato	1	1	14	14	33	33	48	48	4	4	0	0
	Bread, slices ¹	0	0	0	0	0	0	4	4	21	21	75	75
	hot	27	27	52	52	18	18	3	3	0	0	0	0
	Breakfast cereal	16	16	45	45	24	24	15	15	0	0	0	0
	Whole grain products	11	11	12	12	23	23	32	32	15	15	7	7
	Desserts, not fruit	0	0	3	3	11	11	71	71	15	15	0	0
	Meat, fish, poultry ⁴	0	0	2	2	14	14	80	80	4	4	0	0
	Glandular meat	86	86	14	14	0	0	0	0	0	0	0	0
	Other protein	3	3	39	39	43	43	15	15	0	0	0	0
	Eggs	23	23	61	61	15	15	1	1	0	0	0	0
	Butter ¹	1	1	35	35	37	37	21	21	6	6	0	0
	Coffee ¹	45	45	27	27	10	10	14	14	4	4	0	0
	Tea ¹	54	54	39	39	6	6	1	1	0	0	0	0
	Coco cola ¹	53	53	33	33	9	9	4	4	1	1	0	0
	Eating between meals	6	6	31	31	29	29	31	31	3	3	0	0
	Number meals eaten	0	0	0	0	0	0	0	0	31	31	69	69

1. Milk, water, tea, coffee, and coco-cola were calculated in cupfuls; butter in teaspoonfuls, bread in slices, and other food in servings.

2. Vegetables other than green, yellow, or potato.

3. Fruit raw, other than citrus or tomato.

4. Glandular meats not included.

Table 3. Summary of weekly food records of 100 upper-class college women.

Diets checked:	Food	Frequency of eating											
		1-3		4-6		7-13		14-20		21 or more			
		Never occurring	times per week	times per week	times per week	times per week	times per week	times per week	times per week				
No.		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
100	Milk ¹	1	1	7	7	18	18	50	50	22	22	2	2
	Vegetables, total	0	0	0	0	0	0	0	0	19	19	81	81
	cooked, except												
	potatoes	0	0	2	2	14	14	74	74	10	10	0	0
	green or yellow	0	0	2	2	16	16	74	74	8	8	0	0
	raw	1	1	4	4	31	31	59	59	4	4	1	1
	other ²	3	3	23	23	46	46	28	28	0	0	0	0
	White potatoes	3	3	10	10	43	43	43	43	1	1	0	0
	Fruit, total	0	0	0	0	0	0	45	45	47	47	8	8
	cooked	1	1	25	25	43	43	29	29	2	2	0	0
	raw ³	0	0	1	1	28	28	60	60	10	10	1	1
	Citrus or tomato	0	0	3	3	26	26	63	63	7	7	1	1
	Bread, slices ¹	0	0	1	1	0	0	2	2	24	24	73	73
	hot	24	24	48	48	23	23	5	5	0	0	0	0
	Breakfast cereal	18	18	50	50	22	22	10	10	0	0	0	0
	Whole grain products	8	8	16	16	12	12	38	38	17	17	9	9
	Desserts, not fruit	0	0	3	3	9	9	73	73	14	14	1	1
	Meat, fish, poultry ⁴	0	0	0	0	13	13	86	86	1	1	0	0
	Glandular meat	63	63	37	37	0	0	0	0	0	0	0	0
	Other protein	3	3	39	39	39	39	18	18	1	1	0	0
	Eggs	18	18	59	59	20	20	3	3	0	0	0	0
	Butter ¹	0	0	9	9	21	21	44	44	15	15	11	11
	Coffee ¹	35	35	18	18	12	12	27	27	4	4	4	4
	Tea ¹	58	58	32	32	7	7	3	3	0	0	0	0
	Coco cola ¹	50	50	37	37	6	6	6	6	1	1	0	0
	Eating between meals	4	4	23	23	37	37	31	31	4	4	1	1
	Number meals eaten	0	0	0	0	0	0	0	0	22	22	78	78

1. Milk, water, tea, coffee, and coco-cola were calculated in cupfuls; butter in teaspoonfuls, bread in slices, and other food in servings.

2. Vegetables other than green, yellow, or potato.

3. Fruit raw, other than citrus or tomato.

4. Glandular meats not included.

Table 4. Frequency distribution of certain foods in the diets of high school and under-and upper-class college women.

Food	Frequency of eating																	
	Never occurring						1-3 times per wk.						4-6 times per wk.					
	7-13 times per wk.						14-20 times per wk.						21 or more times per wk.					
	H.S. 5	Un. 6	Up. 7	H.S. 5	Un. 6	Up. 7	H.S. 5	Un. 6	Up. 7	H.S. 5	Un. 6	Up. 7	H.S. 5	Un. 6	Up. 7	H.S. 5	Un. 6	Up. 7
	Per cent																	
Milk	2	4	1	28	10	7	27	11	18	24	42	50	13	25	22	6	8	2
Vegetables, total	0	0	0	0	0	0	10	0	0	40	6	0	43	24	19	7	70	81
green or yellow	7	0	0	55	8	2	28	29	16	10	53	74	0	10	8	0	0	0
Citrus fruit or tomato	5	1	0	29	14	3	33	33	26	31	48	63	2	4	7	0	0	1
Whole grain products	15	11	8	43	12	16	19	23	12	14	32	38	9	15	17	0	7	9
Meat, fish, poultry	0	0	0	4	2	0	31	14	13	62	80	86	3	4	1	0	0	0
Glandular meat	94	86	63	4	14	37	1	0	0	1	0	0	0	0	0	0	0	0
Eggs	16	23	18	45	61	59	26	15	20	13	1	3	0	0	0	0	0	0
Coffee	38	45	35	25	27	18	12	10	12	18	14	27	4	4	4	3	0	4
Tea	79	54	58	10	39	32	6	6	7	5	1	3	0	0	0	0	0	0
Coco-cola	76	53	50	22	33	37	1	9	6	1	4	6	0	1	1	0	0	0
Eating between meals	4	6	4	32	31	23	41	29	37	23	31	31	0	3	4	0	0	1
Number of meals	0	0	0	0	0	0	0	0	0	2	0	0	37	31	22	61	69	78

5. High school students.

6. Under-class college students.

7. Upper-class college students.

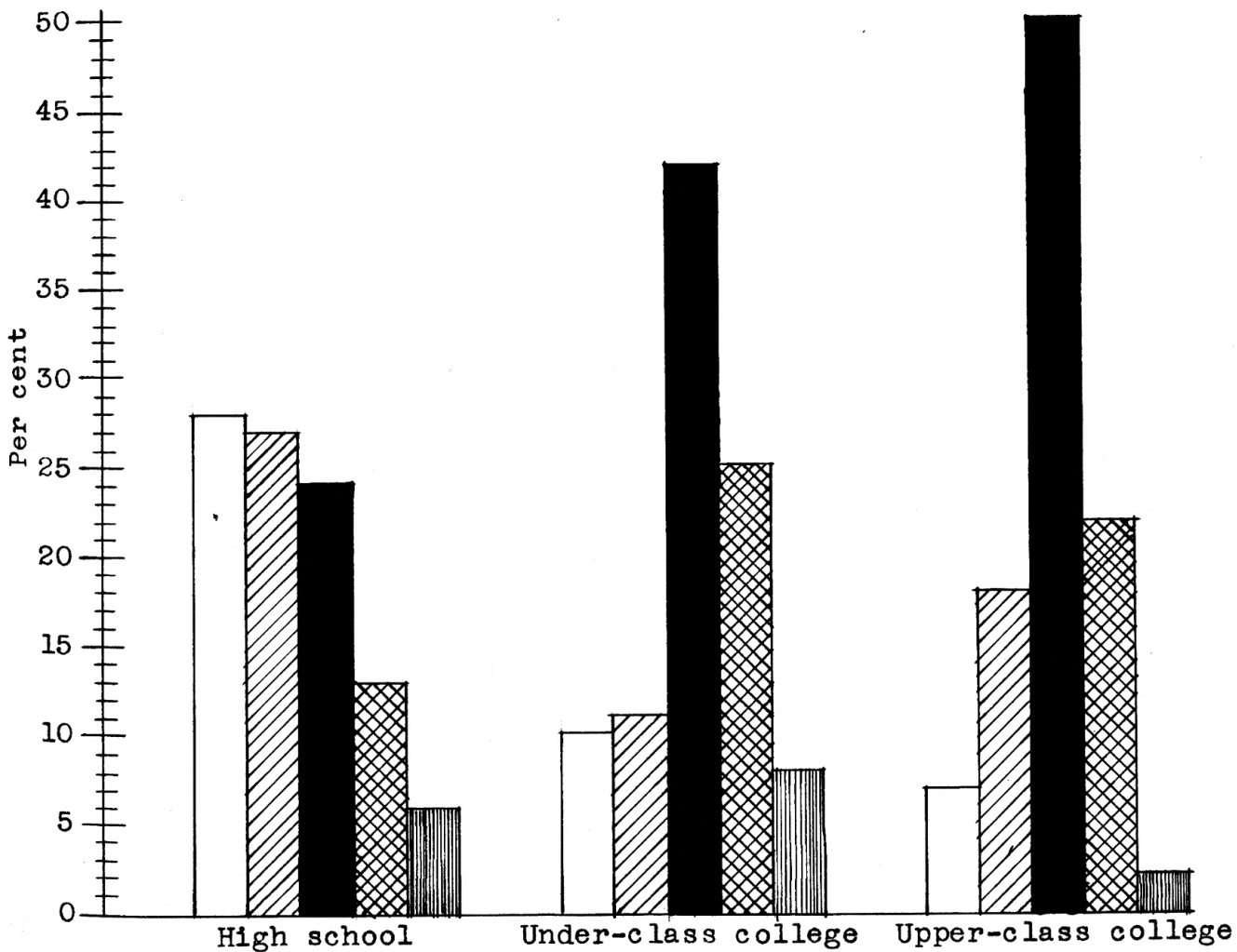
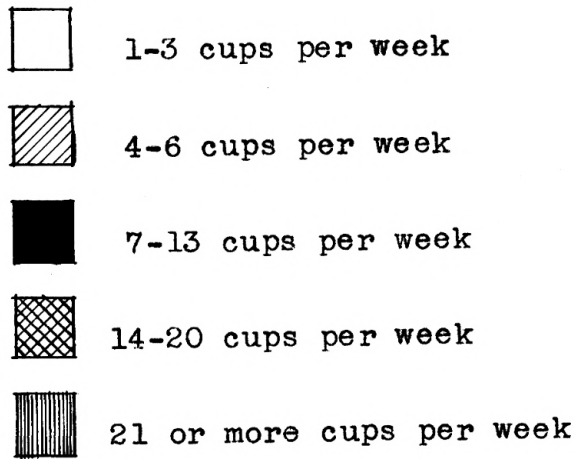


Fig. 1. Consumption of milk.

class college students showed more extremes in milk consumption than upper-class ones, 14 compared with 8 per cent using less than four cups weekly, and 33 compared with 24 per cent using two cups or more daily. Fifty per cent of the upper-class and 42 per cent of the under-class women used milk 7 to 13 times a week.

College students ate many more total vegetables than the high school girls (Table 4). Only 7 per cent of the latter ate them three or more times daily while 70 per cent of the under-class and 81 per cent of the upper-class college students ate them this often. No member of the college group ate vegetables less than 7-13 times weekly while 10 per cent of the high school group had them only 4-6 times during the week studied. Upper-class college women ate a few more total vegetables than under-class ones but the difference was slight.

Of the high school students, 60 per cent used green and yellow vegetables less than four times per week, while 63 per cent of the under-class and 82 per cent of the upper-class college women consumed them two or more times daily (Table 4, Fig. 2). The upper-class college students proved to be somewhat superior in the consumption of green and yellow vegetables, totaling 960 servings during the week compared with 861 for the under-class women.

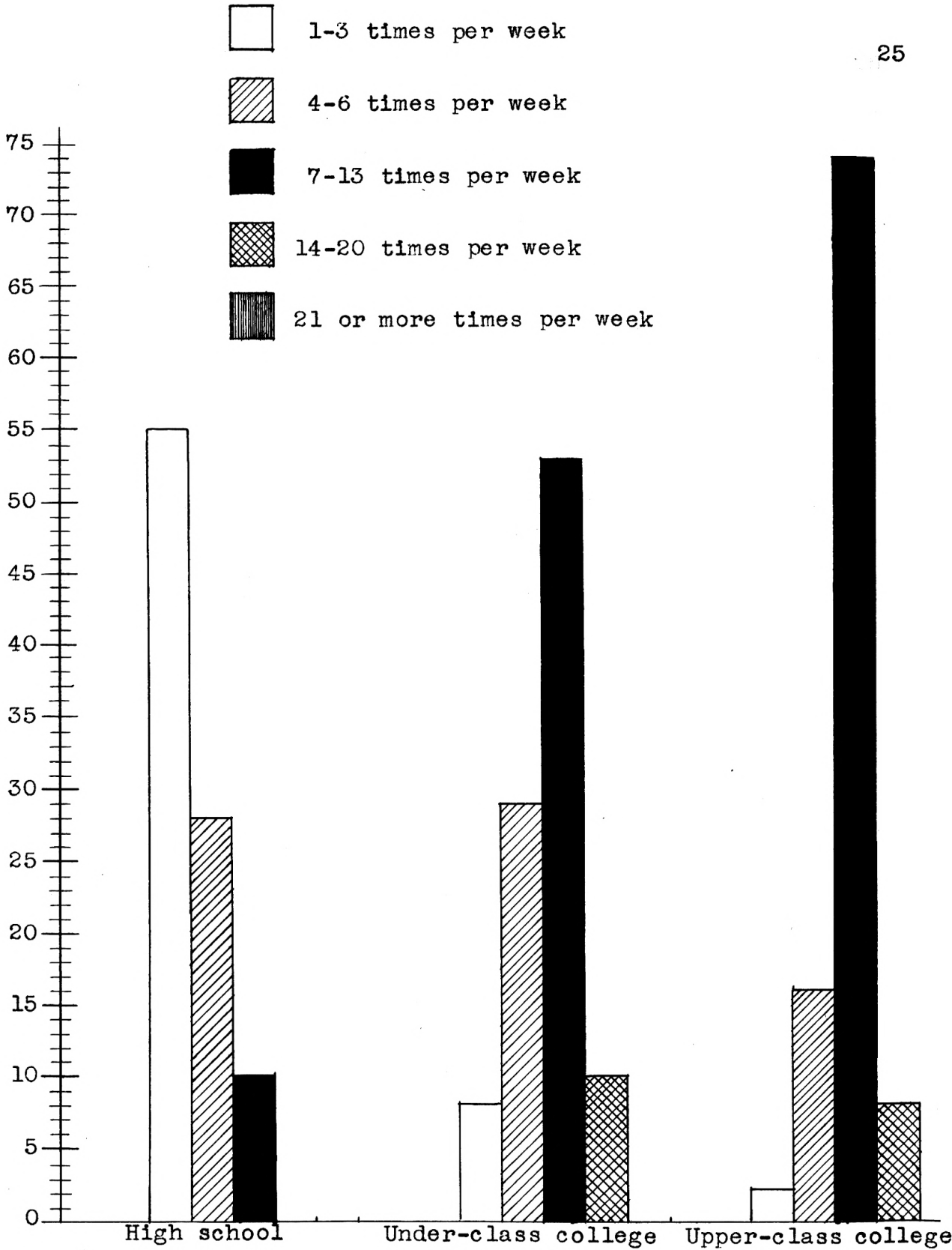


Fig. 2. Consumption of green and yellow vegetables.

The high school girls also used fewer citrus fruits or tomatoes than the college groups, and the upper-class women exceeded the under-class women in this respect by 18.2 per cent (Table 4, Fig. 3). Of the high school group, 34 per cent ate citrus fruits or tomatoes less than four times a week, while 52 per cent of the under-class and 70 per cent of the upper-class college students consumed these foods two or more times daily. Only 1 per cent of the latter group ate citrus fruits or tomatoes as often as three times each day.

The high school girls ranked lowest of the three groups in the consumption of whole grain products, 77 per cent using them not more than 4-6 times during the week of the study (Table 4, Fig. 4). Only 46 per cent of the under-class and 36 per cent of the upper-class college women ate as few grain products as this. No high school student used whole grain cereals as often as three times daily but 7 per cent of the under-class and 9 per cent of the upper-class college group consumed them this frequently. Somewhat more whole grain products were eaten by the upper-class college students, 64 per cent of this group averaging two or more daily, compared with 54 per cent for the under-class college women.

Less than one serving of meat daily was reported by 35

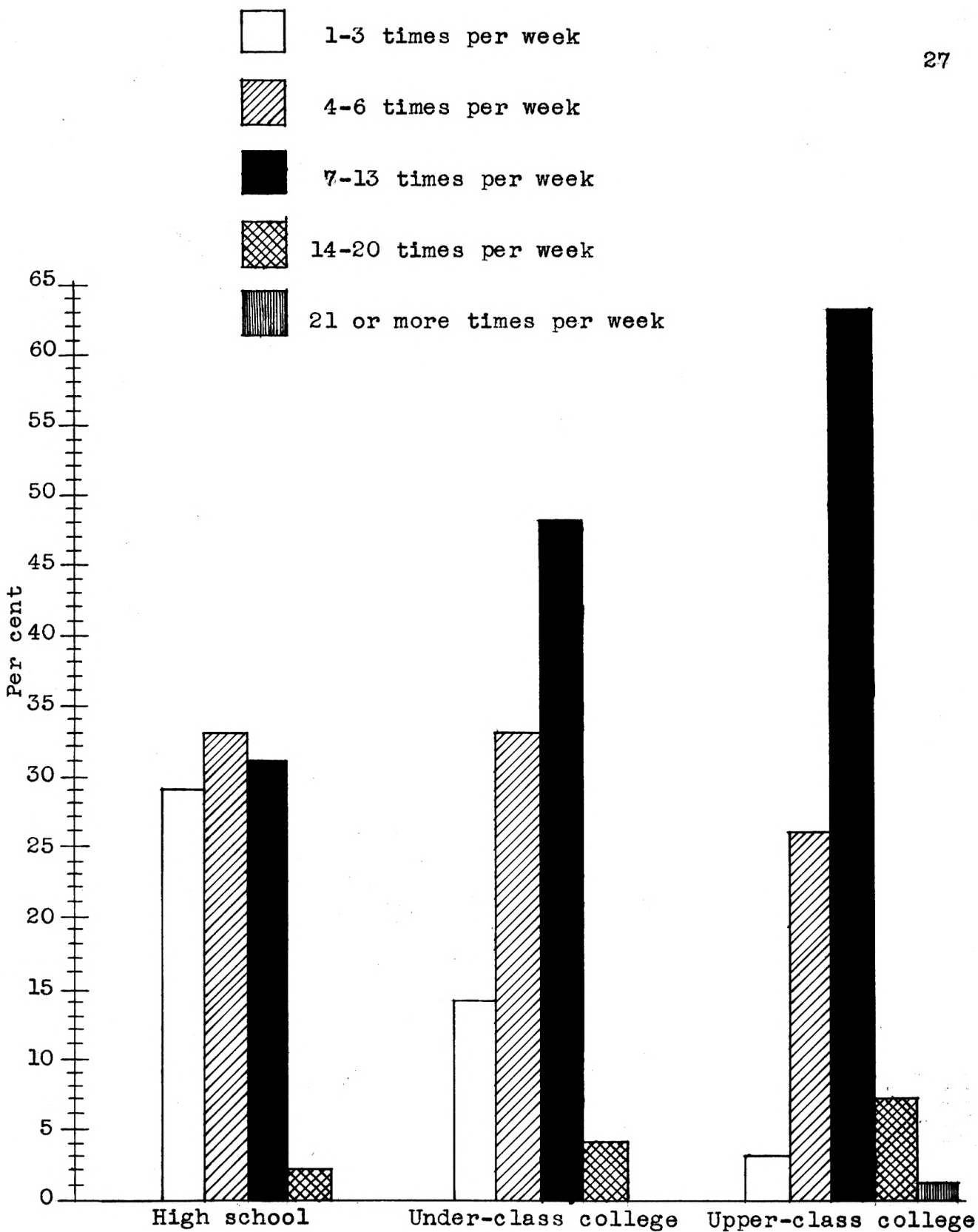


Fig. 3. Consumption of citrus fruit or tomatoes.

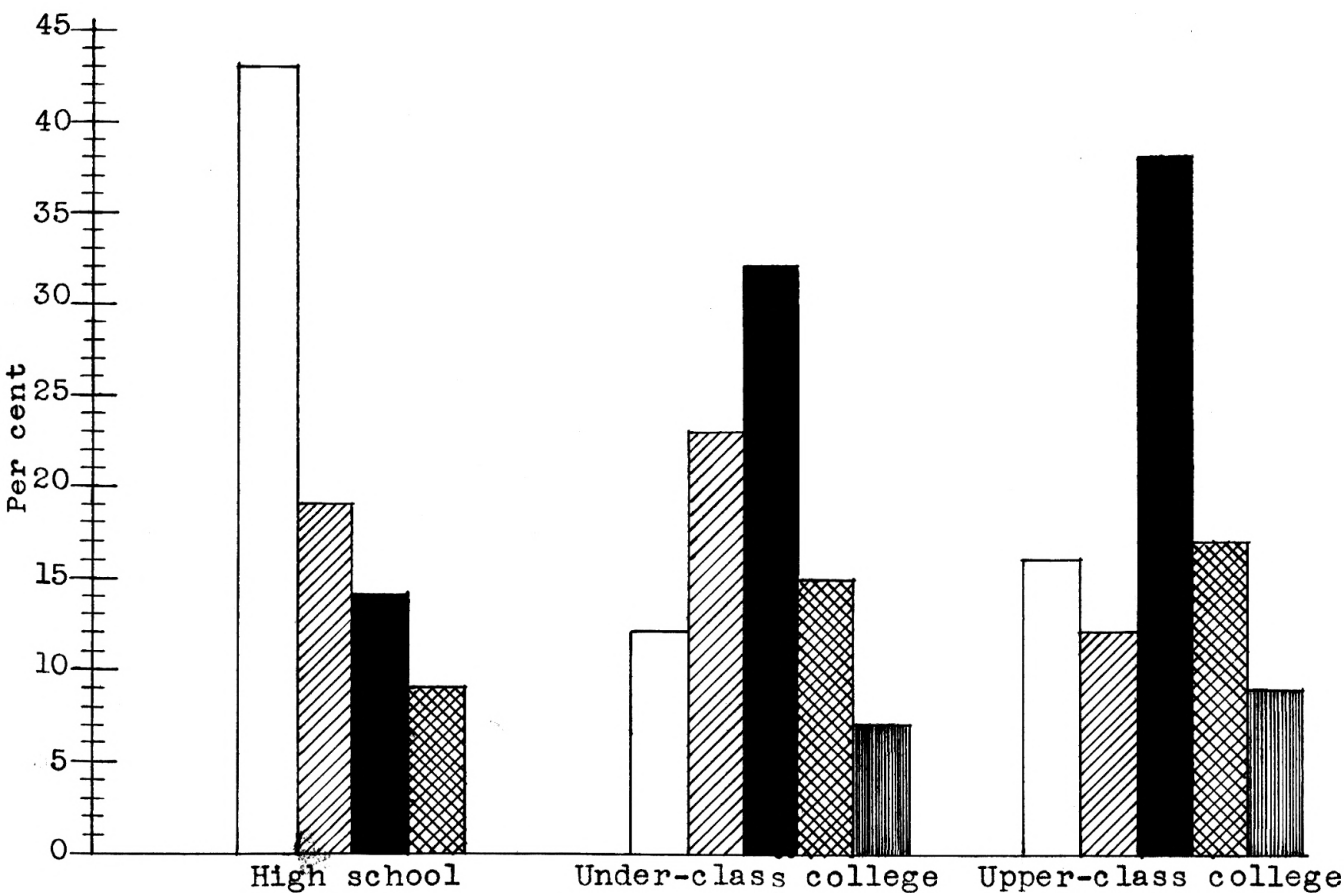
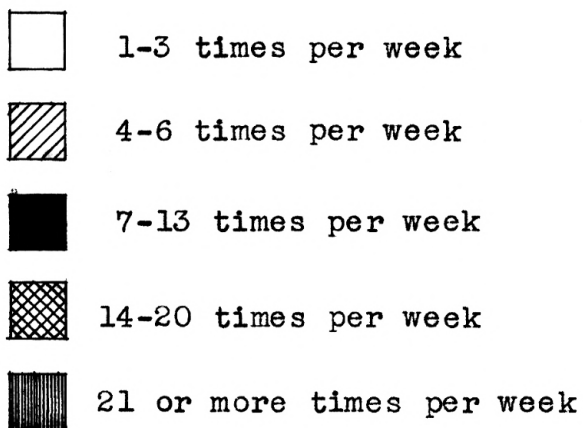


Fig. 4. Consumption of whole grain products.

per cent of the high school students, while but 16 per cent of the under-class college women and 13 per cent of the upper-class ones used such a limited amount (Table 4). Only 65 per cent of the high school girls consumed meat two or more times daily, while 84 per cent of the upper-class college group ate it this often. Apparently high school students ate somewhat less meat than college women, but little difference in meat consumption was observed for the two college groups.

Of the high school girls, 94 per cent received no glandular meat, but 1 per cent partook of it as often as 7-13 times during the period studied. No under-or upper-class college student consumed glandular meat more often than 1-3 times per week, and in only 14 and 37 per cent respectively, did the frequency reach this level. Upper-class women apparently ate glandular meat most frequently of the three groups, but even with them, 63 per cent used none at all. Evidently, this type of meat was not popular with these students.

Less than one egg daily was eaten by 87 per cent of the high school girls but the remaining 13 per cent ate one 7-13 times weekly (Table 4). Of the under-class college women, 99 per cent had less than one egg each day. This was also the case with 97 per cent of the upper-class students.

Only 3 per cent of this latter group had eggs as often as 7-13 times during the week's survey. It was evident that high school students ranked higher than either the under-or upper-class college women in the consumption of eggs. The former group ate a total of 350 eggs during the week of the study compared with 207 and 248 respectively for the latter two groups.

Coffee occurred no more than 4-6 times per week in 75 per cent of the high school diets, but the remaining 25 per cent of this group drank as much as two or more cups daily (Table 4). Less than one cup each day was consumed by 82 per cent of the under-class and 65 per cent of the upper-class college students, but of the same groups the remaining 18 and 35 per cent respectively drank two or more cups each day. The heaviest coffee drinkers apparently were the upper-class college group.

No tea was consumed by 79 per cent of the high school girls, whereas 16 per cent of those drinking tea partook of it no more than 4-6 times during the week and only 5 per cent drank as much as two cups daily. None of the members of the three groups drank more than two cups of tea a day and 54 per cent of the under-class and 58 per cent of the upper-class college women never used tea. The high school girls apparently drank tea somewhat less often than college

women, but no great difference in tea consumption was noted for the latter two groups. In both cases, iced tea appeared more frequently in the menus than the hot beverage.

The high school group also drank few coco-colas, 76 per cent of the girls never drinking them, while only 53 per cent of the under-class and 50 per cent of the upper-class college women refrained from taking this beverage (Table 4). Of those drinking coco-colas, less than one per day was consumed by 23 per cent of the high school girls while 42 and 43 per cent of the under-and upper-class college students, respectively, drank this amount. The college women consumed more coco-colas than the high school students but little difference was observed in its consumption by the two college groups.

For between-meal eating, an average of less than once a day was reported by 73 per cent of the high school girls while 60 per cent of both under-and upper-class college women ate between meals this frequently (Table 4). Of the high school group, 23 per cent partook of between-meal foods as often as 7-13 times weekly, while 34 and 36 per cent, respectively, of the under-and upper-class college students were in this range. Between-meal consumption showed little variation for the three groups but tended to be lower with the high school girls. The intake of food between meals ap-

peared to increase directly with the time spent in college, upper-class women breaking this rule somewhat more frequently.

Candy was eaten by 52 per cent of the high school girls as a between-meal food. The average for those eating it was 2.3 times per person during the week, which amounted to a mean of 1.2 times for the entire group. Candy was eaten during the week by 55 upper-class and 48 under-class college students. The mean for the college women was 51.5 per cent, so it appears that there was little difference in the number of high school and college students indulging in candy. On the other hand, the average number of times that candy was consumed per capita during the week of the study was only 0.85 for the entire college group. Upper-class women ate candy somewhat more frequently than under-class ones, averaging 97 times for 55 students, compared with 74 times for 48 students in the under-class group.

Of the high school group, only 2 per cent averaged but two meals per day; the remaining 98 per cent consumed from 14-20 or more during the week (Table 4). Three or more meals daily were eaten by 69 per cent of the under-class college students but of this group 31 per cent ate only 14-20 weekly. At least two or more meals a day were eaten by 22 per cent of the upper-class college women and 78 per cent

of this group ate three or more meals daily during this study.

The high school girls ate fewer meals than did the college students (Table 4). Morning and evening meals were most often omitted and were frequently never eaten by some members of this group. Of the 100 high school diets studied, 20 girls omitted 52 suppers and 12 girls eliminated 42 breakfasts. Seven members of this group frequently omitted two meals daily. These were usually the morning and evening meals. College students were inclined to omit Sunday breakfast. Those eating in commercial places and the group living at home were most delinquent in this respect. Forty-one meals were omitted by 89 women living in organized groups and 27 meals were eliminated by 49 women living at home. This omission of meals apparently contributed to the frequency of eating between meals.

The frequency distribution of certain foods in the diets of college women as affected by place of eating is indicated in Table 5. It was desired to observe the effects of living conditions of college women upon their food intake and habits of eating. With this end in view, the under-and upper-class college records were further subdivided according to the place where the students ate. The cases were too few in any one division to be considered

Table 5. Frequency distribution of certain foods in diets of college women as affected by place of eating.

Food	:Recom- :mended: :No. of :serv- :ings :per :week	Number of servings eaten per week													
		Whole		Residence hall		Light housekeeping		Living at home		Commercial ⁸		Organized ⁹			
		Under-	Upper-	Under-	Upper-	Under-	Upper-	Under-	Upper	Under-	Upper-	Under-	Upper-		
		:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college	:class :college		
Milk, cups:	14	: 10	11	: 11	9	: 12	11	: 11	9	: 16	10	: 9	10		
Vegetables: green or: yellow	: 7	: 8	10	: 9	10	: 10	8	: 8	9	: 7	10	: 9	10		
Citrus fruit or: tomato	: 7	: 7	9	: 6	7	: 5	8	: 8	10	: 5	9	: 8	9		
Whole grain products:	14	: 8	9	: 10	7	: 10	14	: 7	9	: 6	7	: 9	10		
Meat, fish, or poul- try ¹⁰	: 7	: 9	10	: 9	9	: 7	9	: 8	8	: 9	10	: 10	9		
Glandular meat	: 1	: 0.03	0.07	: 1	2	: 0.0	0.04	: 0.02	0.07	: 0.0	0.08	: 0.02	0.04		
Eggs	: 7	: 2	2	: 2	1	: 4	2	: 2	3	: 0.07	2	: 2	3		
Coffee	:)not	: 3	5	: 1	3	: 7	5	: 4	6	: 4	6	: 2	5		
Tea	:)more	: 1	1	: 1	1	: 1	0.04	: 0.05	1	: 0.05	2	: 1	1		
Coco-cola	:)than 7	: 2	2	: 1	2	: 1	1	: 1	1	: 3	2	: 2	2		
Eating be- tween meals	: 0	: 5	6	: 6	5	: 6	4	: 5	7	: 5	5	: 6	7		
No. of meals:	21	: 19	20	: 19	19	: 21	19	: 20	20	: 19	20	: 19	21		
No. in group		: 100	100	: 8	15	: 4	9	: 26	23	: 11	15	: 51	38		

8. Including cafeteria and cafes.

9. Including sororities and boarding houses.

10. Not including glandular meat.

representative but they may be regarded as suggestive of the eating habits of those living under these conditions. High school girls were omitted from this portion of the study as practically all of them ate at home.

It was evident that the number of upper-class women eating at home was only slightly below that of the under-class students. A somewhat larger number of the members of the upper-class did light housekeeping as might have been expected with a slightly older group.

Approximate intakes are indicated in Table 5. The following points may be noted:

Only one group, consisting of 11 under-class students eating in commercial places, met the standard for milk. The rule of "one serving of green or yellow vegetables daily" was more than met in every case. Students eating in residence halls and organized houses had diets slightly superior in this respect.

Not all students had one serving of citrus fruits or tomatoes every day. Under-class women consumed less of this type of food than those of the upper-class. The students eating at home, representing 24.5 per cent of the entire college group, ate most generously of these foods.

Only the upper-class light housekeeping group, consisting of nine students, averaged two servings of whole grain

products each day. The mean for three groups was only one serving daily and the other one ate less than this amount. Those doing light housekeeping uniformly ranked highest in this dietary essential.

All groups except the under-class light housekeeping one ate more than one serving of meat, fish, or poultry daily, although none averaged as many as two. Also, none fell below the standard in this respect. Glandular meats were eaten in negligible amounts by all students except those living in the residence hall.

No group met the standard of one egg daily and only the under-class light housekeeping one averaged as many as four eggs during the week. Those eating in commercial houses ranked lowest in this respect. A good many students apparently never ate eggs as such.

With the exception of the light housekeeping group, upper-class students used more coffee, tea, and coco-colas than under-class ones. Those eating in commercial places drank these beverages in greatest quantity while those in light housekeeping quarters ranked second.

The mean between-meal intake for no group was less than four foods per capita during the week of the study. On this same basis, only two groups, the upper-class women living at home and those living in organized groups, ate as often

as once between meals each day.

The under-class light housekeeping and the upper-class organized students were the only ones to meet the standard requirement of 21 or more meals weekly. In both instances, those living in the residence hall omitted the greatest number of meals, each averaging 19 for the week.

College women eating in commercial places used the least candy, consuming it on the average only once during the week. Students living at home and in light housekeeping quarters ate candy more frequently than the other groups as evidenced by a mean intake for each of 2.2 times during the week studied. Those living in the residence hall and in organized groups showed little difference in the consumption of candy. The mean per capita intake for the former averaged 1.8 times and the latter 1.4 times weekly during this study.

Because of the limited numbers in these groups, it seemed unwise to draw any conclusions regarding the effect of living quarters upon the choice of food, although some trends appear to be evident.

A comparison of the water consumption of the high school and under-and upper-class college students was made in Table 6. The water intakes were based upon the number of cups drunk daily by the students. These were tabulated

Table 6. Comparison of water consumption of high school and under-and upper-class college students.

Group	Place of eating	Water							
		Cups per day							
		0-4		5-8		9 or more		Total	
		No.	Per cent	No.	Per cent	No.	Per cent		
High school girls	Home	35	35.0	54	54.0	11	11.0	100	
	All	35	35.0	54	54.0	11	11.0	100	
Under-class college women	Home	4	15.4	20	76.0	2	7.7	26	
	Commercial, including cafeteria	4	36.4	6	54.6	1	9.1	11	
	Organized groups, including sororities and boarding houses	4	7.8	41	70.6	6	11.8	51	
	Residence hall	0	0.0	6	75.0	2	25.0	8	
	Light housekeeping rooms	0	0.0	4	100.0	0	0.0	4	
	All	12	12.0	77	77.0	11	11.0	100	
	Upper-class college women	Home	4	17.4	16	69.6	3	13.0	23
Commercial, including cafeteria		0	0.0	12	80.0	3	20.0	15	
Organized groups, including sororities and boarding houses		9	23.7	26	68.4	3	7.9	38	
Residence hall		1	6.7	13	86.7	1	6.7	15	
Light housekeeping rooms		2	22.2	7	77.8	0	0.0	9	
All		16	16.0	74	74.0	10	10.0	100	

as follows: 0-4, 5-8, and 9 or more cups per day, thereby approximating less than half the amount believed desirable, half or more, and generous intakes.

The high school students apparently consumed less water during a day than the college groups. They averaged a total of 547 cups per week as compared with 662 and 640 cups respectively for the under-and upper-class college women. Of the high school girls, 35 per cent drank from 0-4 cups of water daily while only 11 per cent received nine or more. Of the 100 under-class women observed, 77 per cent drank 5-8 cups per day and in this case also, 11 per cent reported drinking nine or more. Only 10 per cent of the upper-class college students consumed the optimal number of cups of water daily whereas 74 per cent drank 5-8 cups and 16 per cent used 0-4 cups of water per capita per day. Apparently, the habit of drinking an adequate volume of water did not improve as the students continued in college.

CONCLUSIONS

Compared with college women, high school girls were found to use more eggs, but less water and milk, fewer total vegetables, green and yellow vegetables, citrus fruits and tomatoes, whole grain products, and meat, fish, or poultry,

including glandular meat. They consumed fewer meals per day, but apparently ate somewhat less frequently between meals. This group tended to drink smaller amounts of coffee tea, and coco-cola than the college students.

The food habits of the upper-class college women were superior to those of under-class students in that they drank slightly more milk, ate more total vegetables, green and yellow vegetables, citrus fruits and tomatoes, whole grain products, and eggs. Little difference was noted in the meat consumption of the two groups. The under-class women ate fewer times between meals, and drank more water and less coffee, tea, and coco-cola.

The diets of the high school students used in this study ranked consistently lower than those of the college women in the consumption of many of the protective foods. The diets of the upper-class students were slightly superior to those of the under-class group.

Considered as a whole, when measured by compliance with the accepted food rules, all the diets were deficient in eggs, milk, whole grain products, and water. The students all ate too frequently between meals and drank too much coffee, tea, and coco-cola. In addition, the high school group ate too few fruits and vegetables.

This study indicated that some improvement in dietary

practices was made with increase in knowledge of health habits and nutrition. It suggests that greater improvement is necessary if malnutrition is to be decreased appreciably.

ACKNOWLEDGMENT

Sincere appreciation is expressed to Dr. Martha S. Pittman, head of the Department of Food Economics and Nutrition, for her interest and guidance in directing this study. Gratitude is also due the students who, through their cooperation, made this study possible.

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Diet Record

[illegible]

Summary of Individual Diets.

[illegible]

Form 3.

Summary of weekly food and water records.

Number of persons	Food	Frequency of eating									
		1-3		4-6		7-13		14-20		21 or more	
		Never occurring	times per week	times per week	times per week	times per week	times per week	times per week	times per week	times per week	times per week
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
	Milk ¹										
	Vegetables, total										
	cooked, except										
	potatoes										
	green or yellow										
	raw										
	other ²										
	White potatoes										
	Fruit, total										
	cooked										
	raw ³										
	Citrus or tomato										
	Bread, slices ¹										
	hot										
	Breakfast cereal										
	Whole grain products										
	Desserts, not fruit										
	Meat, fish, poultry ⁴										
	Glandular meat										
	Other protein										
	Eggs										
	Butter ¹										
	Coffee ¹										
	Tea ¹										
	Coco-cola ¹										
	Eating between meals										
	Number meals eaten										
	Water, cups per day		0-4			5-8			9 or more		

1. Milk, water, tea, coffee, and coco-cola were calculated in cupfuls; butter in teaspoonfuls, bread in slices, and other food in servings.

2. Vegetables other than green, yellow, or potatoes.

3. Fruit raw, other than citrus or tomato.

4. Glandular meats not included.